

Increasing meltwater discharge from the Nuuk (SW) region of the Greenland ice sheet and implications for glacier mass balance (1989-2012)

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We assessed the runoff and surface mass budget of the glacier catchments in the Nuuk (south-western) region of the Greenland ice sheet, using automatic weather station (AWS) and regional climate model (RCM) data. The region encompasses six glaciers that contribute to the hydrology of Nuuk Fjord, amongst them Kangiata Nunata Sermia, the largest marine-terminating glacier south of Jakobshavn Isbræ. The separate catchments were delineated using a surface velocity map. Hereafter, the coarse-resolution RCM data were inter- and extrapolated to fit the exact ice cover, only using data from the models' ice-masked areas. RCM data were evaluated using AWS and proglacial river discharge measurements. Runoff and surface mass budget show large interannual variability due to precipitation, and were trendless roughly up to 2000, when this area is estimated to have been in near-equilibrium. Since 2000, meltwater runoff has increased and SMB decreased, resulting in a negative total mass balance, taking into account the frontal ablation at the marine-terminating glaciers. If conditions in recent years were to set the norm for the remainder of this century, we can expect a SMB contribution to sea level rise of more than 5 mm by 2100 from this relatively small section (2.7%) of the ice sheet.